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EXAMINER

NAFF, DAVID M

ART UNIT	PAPER NUMBER
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1651

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/429889

Applicant(s)

Shi et al

Examiner

K. Ad

Group/Art Unit

1657

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

## Status

- ☒ Responsive to communication(s) filed on 9/4/01
- ☐ This action is FINAL.
- ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- ☒ Claim(s) 1-6 is/are pending in the application.
- ☐ Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- ☒ Claim(s) 1-6 is/are rejected.
- ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- ☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

- ☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
  - ☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been received.
  - ☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_
  - ☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s) 9 1 Filed 10/1/01
- ☐ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other \_\_\_\_\_

Office Action Summary

The amendment of 9/4/01 has been entered. The amendment amended claims 1-3 and 5.

Claims examined on the merits are 1-6 which are all claims in the application.

5 The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10 Claims 1 and 2 are confusing and unclear by not having clear antecedent basis for "said solid support" in "a." and "the porous polymer" in the last line of the claims.

In claims 1 and 2, reciting "said array" in steps a and b is confusing since "array" represents an arrangement of the porous polymer pads on the support, and it is the porous polymer pads of the array instead of the array that are dried.

15 Claims 1, 2 and 5 are unclear by requiring freezing the array on the solid support, and not requiring an initial step of providing the array on the support. It is unclear as to whether freezing is attaching the array to the support or is freezing the array after being attached to the support.

Claim 1 is an improper improvement claim. As set forth in MPEP 608.01(m) (5th paragraph on page 600-70) and 37 CFR 1.75(e), an improvement claim must contain a preamble setting forth elements or steps that are known followed by a phase such as "wherein the improvement comprises" (paragraph bridging pages 600-68 and 600-69 of the MPEP). As

is apparent from Khrapko et al (5,552,270) (col 4, lines 1-15) and Chetverin et al (5,616,478) (col 12, lines 55-62) cited in the Background Art in the specification, and Guschin et al (page 205, left col, lines 11-16) (listed on form PTO-1449 of 5/4/00), it is known to provide an  
5 array of porous polymer pads on the surface of a solid support and then dry the array of porous polymer pads on the surface.

To overcome the above indefiniteness in regard to claim 1, it is suggested the claim be written to read as follows --

In a method of providing an array of porous polymer pads on the  
10 surface of a solid support and then drying the array of porous polymer pads on the surface, the improvement comprising carrying out said drying by freezing drying by a method comprising:

- a. freezing said array of porous polymer pads on the surface, and then
- 15 b. drying said array of porous polymer pads on the surface at reduced pressure, wherein said freeze drying increases the size of pores of the porous polymer pads on the surface. --.

The preamble of claim 2 is unclear by reciting "An array comprising:" since an array is an arrangement rather than a material.  
20 Additionally, the claim is not in proper form for a product-by-process claim.

To overcome the above indefiniteness in regard to claim 2, it is suggested the claim be changed to read --

An array of dried porous polymer pads on the surface of a solid  
25 support produced by freeze drying by a method comprising:

- a. providing an array of porous polymer pads on the surface of a solid support,
- b. freezing said array of porous polymer pads on the surface, and then
- 5 C. drying said array of porous polymer pads on the surface at reduced pressure, wherein said freeze drying increases the size of pores of the porous polymer pads on the surface. --.

Claim 5 is unclear by reciting "an array comprising" for the type of reason set forth above in regard to claim 2. In this claim and in claim 10 2, the term "array" sets form an arrangement of the porous polymer pads on the support and cannot comprise the porous polymer pads on the support.

To overcome, the above indefiniteness, it suggested that claim 5 be changed to read --

15 A method for freeze drying an array of porous polymer pads on the surface of a solid support, said method comprising:

- a. providing an array of porous polymer pads on the surface of a solid support,
- b. freezing said array of porous polymer pads on the surface, and
- 20 then

C. drying said array of porous polymer pads on the surface at reduced pressure. --.

Claim 6 is unclear by being dependent on claim 5 and requiring steps of being "frozen" and "dried under vacuum to remove water" since 25 claim 5 requires "freezing" and "drying---at reduced pressure". It is suggested that claim 6 by amended by canceling "the porous polymer pads

are frozen" in line 1 and inserting -- said freezing is --, and in line 2, canceling "dried under vacuum to remove water" and inserting -- said drying is --.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable  
5 over Guschin et al or Khrapko et al (5,552,270) or Chetverin et al (5,616,478) in view of Funk et al (5,973,014), and if necessary in further view of Ruchel (1978) or Ruchel (1975) or Blank et al.

The claims are drawn to methods of improving and freeze drying an array of porous polymer pads on the surface of a solid support by  
10 freezing and drying the array of porous polymer pads on the support at reduced pressure, and to an array produced by the method.

Guschin et al disclose drying an array of micromatrices of polyacrylamide gel pads on a support for use in immobilizing a compound such as DNA. See the abstract (page 203, left col); the paragraph  
15 bridging pages 202 and 204;; page 205, left col, first complete paragraph; page 207, right col under "Microchip Fabrication"; and page 211, left col, under "CONCLUSION".

Khrapko et al (col 4, lines 1-15) and Chetverin et al (col 12, lines 55-62) disclose providing an array of porous polymer gel pads on the  
20 surface of a solid support and then drying the array of porous polymer gel pads on the surface. Chetverin et al disclose being lyophilized or dried in vacuo (col 12, lines 58-59).

Funk et al disclose freeze drying swollen, non-porous, hydrophilic polymers to obtain porous, hydrophilic, highly swellable polymers having  
25 a desired pore size and pore distribution (col 2, line 58 to col 3, line 10), and which retain their original shape (col 3, lines 7-8). Monomers

used to prepare the polymer can be amides of acids such as acrylic acid (col 3, lines 45-51). The amount of water in the swollen polymer being freeze dried can be used to control the pore size of the freeze dried polymer (col 3, lines 16-18).

5       Ruchel (1978), Ruchel (1975) and Blank et al disclose freeze drying polyacrylamide gels to obtain porous polyacrylamide polymers.

It would have been obvious to carry out the drying of the array of polymer gel pads on the support of Guschin et al or Khrapko et al or Chetverin et al by freeze drying to obtain to the function of freeze  
10       drying to produce a porous, highly swellable polymer of a desired pore size and distribution as disclosed by Funk et al. It would have been expected that freeze drying can be used to increase the pore size since Funk et al disclose using the amount of water in the swollen polymer freeze dried to obtain a desired pore size. The further disclosure of  
15       Ruchel (1978), Ruchel (1975) or Blank et al of freeze drying a polymer gel to obtain a porous polymer, if needed, would have further suggested carrying out the drying of Guschin et al or Khrapko et al or Chetverin et al by freeze drying. Ruchel (1978), in particular, discloses that freeze drying produces a sponge like structure without gel matrix shrinkage  
20       (page 564, lines 15-18).

Applicant's arguments filed 9/4/01 have been fully considered but they are not persuasive.

In response to references applied in the previous office action of 3/29/01, applicants urge that the references do not suggest freeze drying  
25       to increase pore size. However, the Funk et al reference presently applied suggests that freeze drying can be used to obtain a desired pore

size and distribution, and the use of freeze drying for this purpose would have been clearly obvious. Increasing the pore size would have been expected to provide enhanced binding of substances within pores of the polymer pads since larger pores will obviously provide less impeded  
5 access to the interior of the pores.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David M. Naff whose telephone number is (703) 308-0520. The examiner can normally be reached on Monday-Thursday and every other Friday from about 8:30 AM to about 6:00  
10 PM.


If attempts to reach the examiner by telephone are unsuccessful, a message can be left on voice mail.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Wityshyn, can be reached at telephone number  
15 (703) 308-4743.

The fax phone number is (703) 305-3014 or 308-4242.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0196.

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DAVID M. NAFF  
PRIMARY EXAMINER  
ART UNIT 1651